U.S. Department of Transportation
Federal Highway Administration

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innovation ingenuity imagination invention
Every Day Counts

CDOT CM/GC Program Evolution

Agenda

- CM/GC Program Overview
- CDOT Project Delivery Matrix
- CDOT CM/GC Projects
- CDOT Lessons Learned
- Questions

CDOT CM/GC Program

- CM/GC Program Overview
  - 10 CMGC projects in preconstruction, construction, or completed.
  - Projects include electrical, interchanges, tunnel widening, bridge replacements, ITS, and Accelerated Bridge Construction.
  - CM/GC selection utilizes the CDOT Project Delivery Selection Matrix, FHWA concurrence, Chief Engineer concurrence.
  - RFPs, scoring, and contracts established for first five projects.

CDOT CM/GC Program

- Challenges
  - DOT Processes
    - FHWA requirements
    - Contract and RFP Templates
    - Scoring Templates and Training
    - Financial Tracking and Software compatibility
    - Lack of a standardized system conflicting with quick implementation on projects
    - Environmental Clearance requirements
    - DBB processes need to change to work with CMGC flexibility and iterative design process.

CDOT CM/GC Program

- Industry Challenges and Feedback
  - Industry understanding of the process
  - Project Selection and Transparency
  - RFP and Contract Feedback
  - Selection Panels and Training
  - Consistency and Transparency in all Phases

CDOT Project Delivery Selection Matrix

Project Delivery Selection Objectives:

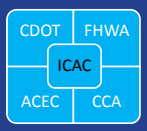
- Provide a risk-based, objective project delivery selection approach.
- Eliminate arbitrary decisions on project delivery selection
- Provide support and justification for CDOT Regions and the Chief Engineer's Office
- Efficiently use of taxpayer funds

CDOT Project Delivery Selection Matrix

- Matrix Implementation
  - Assist CDOT Regions with project delivery selection workshops
  - Successfully used on 16 projects
  - Endorsed by CDOT executive management team and regional staff
  - Evolving process constantly fine-tuned and updated and working on making it all-inclusive for A+B, CMGC, DB, MDB, and SDB.

CDOT Project Delivery Selection Matrix

How was it developed?



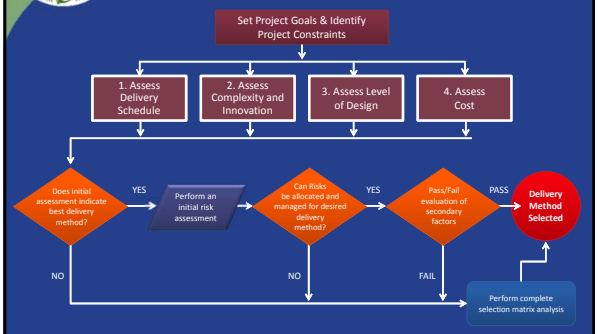
Pilot Projects

Delivery Decision Guide

How does it work?

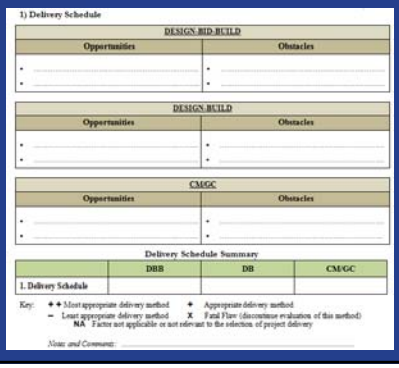
- Create project description checklist
- Develop project goals and identify project constraints
- Evaluate the primary factors
  1. Delivery schedule
  2. Complexity & Innovation
  3. Level of design
  4. Cost
  5. Initial project risk assessment
- Evaluate the secondary factors
  6. Staff experience / availability
  7. Level of oversight and control
  8. Competition and contractor experience

How does it work?



Workshop Blank Form Example

Evaluate Opportunities and Obstacles for Primary and Secondary Factors



1) Delivery Schedule

DESIGN-BID-BUILD	
Opportunities	Obstacles
•	•
•	•

DESIGN-BUILD	
Opportunities	Obstacles
•	•
•	•

CM/GC	
Opportunities	Obstacles
•	•
•	•

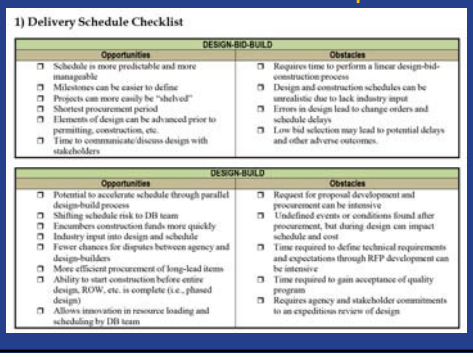
Delivery Schedule Summary

	DBB	DB	CM/GC
1. Delivery Schedule			

Key: ◆◆ Most appropriate delivery method ◆ Appropriate delivery method
– Least appropriate delivery method X Fatal Flaw (discontinue evaluation of this method)
NA Factor not applicable or not relevant to the selection of project delivery

Notes and Comments:

Opportunity and Obstacles Checklist Examples



1) Delivery Schedule Checklist

DESIGN-BID-BUILD	
Opportunities	Obstacles
❒ Schedule is more predictable and more manageable	❒ Requires time to perform a linear design-bid-construction process
❒ Milestones can be easier to define	❒ Design and construction schedules can be unrealistic due to lack industry input
❒ Projects can more easily be "shelved"	❒ Errors in design lead to change orders and schedule delays
❒ Shortest procurement period	❒ Low bid selection may lead to potential delays and other adverse outcomes.
❒ Elements of design can be advanced prior to permitting, construction, etc.	
❒ Time to communicate/discuss design with stakeholders	

DESIGN-BUILD	
Opportunities	Obstacles
❒ Potential to accelerate schedule through parallel design-build process	❒ Request for proposal development and procurement can be intensive
❒ Shifting schedule risk to DB team	❒ Undefined events or conditions found after procurement, but during design can impact schedule and cost
❒ Encumbers construction funds more quickly	❒ Time required to define technical requirements and expectations through RFP development can be intensive
❒ Industry input into design and schedule	❒ Time required to gain acceptance of quality program
❒ Fewer chances for disputes between agency and design-builders	❒ Requires agency and stakeholder commitments to an expeditious review of design
❒ More efficient procurement of long-lead items	
❒ Ability to start construction before entire design, ROW, etc. is complete (i.e., phased design)	
❒ Allows innovation in resource loading and scheduling by DB team	

Opportunity and Obstacles Checklist Examples

CMGC	
Opportunities	**Obstacles**
❒ Ability to start construction before entire design, ROW, etc. is complete (i.e., phased design) ❒ More efficient procurement of long-lead items ❒ Early identification and resolution of design and construction issues (e.g., utility, ROW, and earthwork) ❒ Can provide a shorter procurement schedule than DB ❒ Team involvement for schedule optimization ❒ Continuous constructability review and VE ❒ Maintenance of Traffic improves with contractor inputs ❒ Contractor input for phasing, constructability and traffic control may reduce overall schedule	❒ Potential for not reaching GMP and substantially delaying schedule ❒ GMP negotiation can delay the schedule ❒ Designer-contractor-agency disagreements can add delays ❒ Strong agency management is required to control schedule

Selection Matrix Summary

PROJECT DELIVERY METHOD OPPORTUNITY/OBSTACLE SUMMARY			
	DBB	DB	CM/GC
Primary Evaluation Factors			
1. Delivery Schedule	+	X	++
2. Project Complexity & Innovation	-	N/A	++
3. Level of Design	+	N/A	+
4. Initial Project Risk Assessment	+	X	++
Secondary Evaluation Factors			
5. Cost	+	N/A	+
6. Staff Experience/Availability (Owner)	++	N/A	+
7.Level of Oversight and Control	+	N/A	+
8. Competition and Contractor Experience	+	N/A	+

++ Most appropriate delivery method
\+ Appropriate delivery method
\- Least appropriate delivery method
X Fatal Flaw (discontinue evaluation of this method)
NA Factor not applicable or not relevant to the selection

I-70 Twin Tunnels Widening

I-70 Twin Tunnels Widening

I-70 Twin Tunnels

- Budget: $60 million

Project Scope:

- Widen east-bound segment of the Twin Tunnels
- Add three travel lanes on I-70 for 3.5 mile segment.
- Incorporate Context Sensitive Solutions.
- Complete by Oct 31st, 2013

I-70 Twin Tunnels Widening

- **Project Team**
  - CDOT, Atkins North America, Edward Kraemer and Sons/Obayashi JV
- **Project Challenges**
  - Heavy stakeholder involvement and political implications
  - Clear Creek Waterway
  - Unknown risk in the geology in the tunnels, other risks.
  - CMGC and advanced design during a unfinished NEPA EA process
  - Schedule Driven Project

Dotsero Bridge Rehab Project

The Dotsero Bridge:

- Built in 1935,
- Budget: $6 million

Project Scope:

- Bring shoulder widths and clearance up to current standards
- Replace corroding steel girders, stringers and floor beams.
- Accommodate major storm events.
- Protect spread footings from eroding in major storm events

Dotsero Bridge Rehab

Project Team:
- CDOT, Tsiouvaras Simmons Holderness, Edward Kraemer & Sons

Project Challenges:
- Navigating new process (CM/GC)
- Mitigating impacts to environmental and historic resources
- Coordinating additional improvements with local government

Pecos Street at I-70 Bridge Replacement

Pecos Street Bridge Replacement:
- Built in 1966
- Budget: $6 million

Project Scope:
- Total Bridge replacement
- Build two roundabouts on Pecos Street.
- Replace the existing signalized intersection at I-70 to improve mobility.
- Build pedestrian structure over I-70
- Accelerated Bridge Construction selected for project.

Pecos Street at I-70 Bridge Replacement

Project Team
- CDOT, Wilson and Co., Kiewit Infrastructure

Project Challenges
- Construct roundabouts in a high volume interchange with limited detour routes.
- Closing I-70 during a 50 hour weekend period.
- Utilities relocation and schedule impacts – existing water and gas lines on existing structure

Lessons Learned

- You can never do too much research before you get started with CMGC.
- Research the project delivery programs and software your organization uses and how it will apply to CMGC.
- Don't assume that another RFP or Contract template will work for your organization or project.
- Strong project management and leadership is required. Active project management practices.

Lessons Learned

- Require actual construction personnel on organization and contractor side to be involved all the way through the preconstruction phase.
- Owner Project Managers will work longer hours, put in more work, and put in more effort than other delivery methods.
- Scoping a CM/GC project is critical with respect to scoping estimates and scope creep prevention.
- Get a Independent Cost Estimator that can estimate like a contractor can with production rates, industry software and scheduling capabilities, and experience

Questions?

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